

WHAT IS CLAIMED IS:

1. A semiconductor chip pick-up method for picking up a semiconductor chip adhered to a sheet by using a pick-up head, comprising:

5 a sheet exfoliating step for abutting a suction surface of a sheet exfoliation mechanism against a lower surface of the sheet and for performing vacuum-sucking through the suction surface thereby to exfoliate the sheet from the semiconductor chip; and

10 a sucking and holding step of sucking and holding an upper surface of the semiconductor chip thus exfoliated from the sheet by the pick-up head thereby to pick up the semiconductor chip, wherein

in the sheet exfoliating step, when the vacuum-sucking is  
15 performed through the suction surface, the semiconductor chip adhered to the sheet is bent and deformed in an almost same bent shape in a continuous bent range from an outer peripheral portion of one side of the chip to an outer peripheral portion of another one side of the chip thereby to exfoliate the sheet from a lower  
20 surface of the semiconductor chip.

2. A semiconductor chip pick-up method according to claim 1, wherein the semiconductor chip bends and deforms in a plurality of the bent ranges.

3. A semiconductor chip pick-up method according to claim 1, wherein the semiconductor chip is configured in a rectangular shape, and the bent range is set in a direction which forms a predetermined angle with respect to one side of the semiconductor chip.

4. A semiconductor chip pick-up method according to claim 3, wherein the bent range includes a corner portion of the semiconductor chip.

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5. A semiconductor chip pick-up apparatus for picking up a semiconductor chip adhered to a sheet by using a pick-up head, comprising:

a holding table for holding the sheet; and  
15 a sheet exfoliation mechanism which is disposed beneath the holding table, a suction surface of the sheet exfoliation mechanism being abutted against a lower surface of the sheet to perform vacuum sucking through the suction surface thereby to exfoliate the sheet from the semiconductor chip,

20 wherein the suction surface includes a plurality of suction grooves and a boundary portion which partitions the adjacent suction grooves, the boundary portion is abutted against the lower surface of the sheet to support the sheet at a time of the vacuum sucking, and air is vacuum-sucked from the suction

grooves to bend and deform the semiconductor chip adhered to the sheet together with the sheet thereby to exfoliate the sheet from a lower surface of the semiconductor chip due to the bend deformation.

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6. A semiconductor chip pick-up apparatus according to claim 5, wherein the semiconductor chip is supported by the plurality of boundary portions through the sheet.

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7. A semiconductor chip pick-up apparatus according to claim 5, wherein the semiconductor chip is configured in a rectangular shape, and each of the suction grooves is provided in a direction which forms a predetermined angle with respect to one side of the rectangular-shaped semiconductor chip.

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8. A semiconductor chip pick-up apparatus according to claim 7, wherein the suction grooves are arranged in a manner that corner portions of the semiconductor chip are not positioned just above the boundary portions when the suction surface is abutted against the lower surface of the sheet.

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9. A semiconductor chip pick-up apparatus according to claim 5, wherein the suction grooves are provided at a suction exfoliation tool, and the suction exfoliation tool is attached

to the sheet exfoliation mechanism so as to be exchanged freely.

10. A suction exfoliation tool for use in a semiconductor chip pick-up apparatus for picking up a semiconductor chip adhered to a sheet by using a pick-up head, comprising:

a suction exfoliation tool to be attached to a sheet exfoliation mechanism which has a suction surface being abutted against a lower surface of the sheet to perform vacuum sucking through the suction surface thereby to exfoliate the sheet from the semiconductor chip,

wherein the suction surface provided at the suction exfoliation tool includes a plurality of suction grooves and a boundary portion which partitions the adjacent suction grooves, the boundary portion is abutted against the lower surface of the sheet to support the sheet at a time of the vacuum sucking, and air is vacuum-sucked from the suction grooves to bend and deform the semiconductor chip adhered to the sheet together with the sheet thereby to exfoliate the sheet from a lower surface of the semiconductor chip due to the bend deformation.

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11. A semiconductor chip pick-up method for picking up a semiconductor chip adhered to a sheet by using a pick-up head, comprising the steps of:

abutting a suction surface of a sheet exfoliation mechanism

against a lower surface of the sheet;

performing vacuum-sucking through the suction surface  
thereby to exfoliate the sheet from the semiconductor chip, the  
semiconductor chip adhered to the sheet being bent and deformed  
5 in an almost same bent shape in a continuous bent range from  
an outer peripheral portion of one side of the chip to an outer  
peripheral portion of another one side of the chip thereby to  
exfoliate the sheet from a lower surface of the semiconductor  
chip; and

10 picking up the semiconductor chip by sucking and holding  
an upper surface of the semiconductor chip by the pick-up head.